REMARKS

Applicants respectfully request favorable consideration and allowance of the pending claims.

I. Status of the Claims

Upon entry of this amendment, claims 1-2 and 6-35 remain pending. Claims 7-13 and 15-35 are withdrawn.

Claims 1, 6, 11, 12, 13, 15, and 35 have been amended to delete the term "about" before the minimum zinc concentration of 24 atomic %.

Claims 36 and 37 are new. These claims require a minimum zinc concentration of at least 29 atomic %. Paragraph [0036] discloses several zinc concentration ranges, such as between 2 and 70 atomic percent, or between 5 ant 50 atomic %, or between 5 and 35 atomic %. Paragraph [0037] discloses embodiments wherein the zinc concentration is between 10 and 30 atomic %. These disclosures support the maximum zinc concentrations of new claims 36 and 37, which are stated in their base claims 1 and 35, respectively.

Multiple examples of Pt-Zn-Fe alloys that the inventors actually prepared provide support for the minimum zinc concentration of 29 atomic %. The following table lists the electrode numbers from Table B having zinc concentrations of at least 29 atomic %:

Electrode Number	Zinc concentration in atomic %
38	30.03
31	41.45
23	52.18
37	29.24
17	29.44
30	40.32
29	39.26
2	38.57
9	32.45

39	30.86
10	36.04
26	29.32
11	40.52
18	33.02
3	42.92
27	33.90
19	37.59
1	35.01
22	50.76
15	63.08
12	46.28
28	40.17
35	29.14

The following table lists the electrode numbers from Table C having zinc concentrations of at least 29 atomic %:

Electrode Number	**Zinc concentration in atomic %**
40	43.23
39	35.83
32	36.73
46	34.98
53	34.17
54	41.45
55	47.28
48	48.17
47	42.32
56	52.05
61	40.61
60	33.40
62	46.41
64	55.17
63	51.18

The present situation is on all fours with the situation in *In re Wertheim*, 541 F.2d 257; 191 USPQ 90 (CCPA 1976) in which the court held that a claim directed to a method of preparing an extract having from 35 to 60% solids content was supported by a specification disclosing an extract having from 25 to 60% solids content and two examples in which the extract had 36% and 50% solids content:

> The function of the description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; how the specification accomplishes this is not material. *In re Smith*, 481 F.2d 910, 178 USPQ 620 (Cust. & Pat.App.1973), and cases cited therein. It is not necessary that the application describe the claim limitations exactly, *In re Lukach*, supra, but only so clearly that persons of ordinary skill in the art will recognize from the disclosure that appellants invented processes including those limitations. *In re Smythe*, 480 F.2d 1376, 1382, 178 USPQ 279, 284 (Cust & Pat.App.1973). 191 USPQ at 96.
>
> In the context of this invention, in light of the description of the invention as employing solids contents within the range of 25-60% along with specific embodiments of 36% and 50%, we are of the opinion that, as a factual matter, person skilled in the art would consider processes employing a 35-60% solids content range to be part of appellants' invention and would be led by the Swiss disclosure so to conclude. Cf. *In re Ruschig*, supra. The PTO has done nothing more than to argue lack of literal support, which is not enough. If lack of literal support alone were enough to support a rejection under §112, then the statement of *In re Lukach, supra*, 442 F.2d at 969, 58 CCPA at 1235, 169 USPQ at 796, that "the invention claimed does not have to be described in ipsis verbis in order to satisfy the description requirement of § 112," is empty verbiage. The burden of showing that the claimed invention is not described in the specification rests on the PTO in the first instance, and it is up to the PTO to give reasons why a description not in ipsis verbis is insufficient. 191 USPQ at 98.

Just as "35 to 60%" in *Wertheim* was supported by an *ipsis verbis* range of 25-60% and two examples of 36 and 50%; here the claimed zinc ranges between about 29 atomic percent and 70, 50, 35, or 30 atomic percent are supported by the above listed 46 examples in which the zinc concentration ranged from 29.14 atomic percent to 63.08 atomic % and by *ipsis verbis* ranges of

between 2 and 70 atomic percent, between 5 and 50 atomic %, between 5 and 35 atomic %, between 10 and 30 atomic %.

II. Claim Rejections Under 35 U.S.C. §103(a)

Claim 1 is directed to an alloy for use as a catalyst in oxidation or reduction reactions, the alloy comprising:

-- platinum at a concentration that is between about 10 and about 80 atomic percent,
-- zinc at a concentration that is between 24 atomic % and about 70 atomic %, and
-- at least one of nickel and iron at a concentration that is between about 20 atomic % and about 80 atomic %.

Claims 1, 2, 6, and 14 have been rejected as obvious over JP 52084193 by Ichikawa and U.S. 4,100,180 by Ichikawa et al.

The alloys, the components, and the component concentration ranges disclosed in both of the cited references are identical such that if the claims are patentable over one reference, they are patentable over both. The assignee of the applicants' present application is a Japanese corporation, and the assignee's in-house counsel, who is fluent in Japanese, has reviewed the JP 52084193 reference and has confirmed that the alloy concentration ranges disclosed in the respective references are identical. For example, on page 490, upper-left column, lines 6-15 of JP 52084193 discloses a catalyst comprising:

-- preferably 1.5 to 70% by weight, more preferably 1.5 to 50% by weight iron,
-- 0.5 to 8 % by weight, more preferably 2.5 to 7% by weight zinc, and

-- 22 to 98 % by weight, more preferably 43 to 96% by weight platinum.

This description in JP 52084193 describes the same alloy, components, and component concentration ranges as the description of column 3, lines 1-14 of US 4,100,180. Page 9 of the translation provided by the Office further contains identical component concentration disclosure. The disclosures of the examples in the translation of JP 52084193 and the US 4,100,180 patent are also identical. Accordingly, applicants respectfully submit that the following discussion establishing the non-obviousness of claim 1 is equally applicable to both Ichikawa references.

In order to fairly compare the concentration ranges in the Ichikawa et al. references against the concentration ranges in the claims, Ichikawa et al.'s concentration ranges must be converted from % by weight units to atomic % units. The following table shows the *broadest* possible concentration ranges of each element in the catalyst, stated in terms of *atomic %*, disclosed in each of the cited references:

Ranges Based on Broadest Disclosure

Element	Low (Atomic %)	High (Atomic %)
Iron	4.38	88.75
Zinc	0.54	19.96
Platinum	7.58	93.57

The preferred concentrations of the components of the alloy are stated to be 1.5 to 50 wt.% iron, 2.5 to 7 wt.% zinc, and 43 to 96 wt.% platinum. The broadest possible concentration ranges, stated in terms of atomic %, of the preferred alloys of the Ichikawa references are set forth in the following table:

Ranges Based on Preferred Disclosure

Element	Low (Atomic %)	High (Atomic %)
Iron	4.45	76.06
Zinc	3.25	17.76
Platinum	18.03	88.32

The following table displays the concentrations of each component in terms for atomic % for each of Ichikawa et al.'s Examples 1-13 of the invention:

Compositions of Examples of the Invention

Example	Iron (atomic %)	Zinc (atomic %)	Platinum (atomic %)
1	7.16	14.27	78.57
2	7.72	14.21	78.06
3	12.35	13.49	74.16
4	7.52	12.85	79.63
5	4.59	13.84	81.57
6	69.66	6.83	23.51
7	13.11	13.63	73.26
8	8.47	6.17	85.36
9	31.83	2.04	66.13
10	30.54	6.19	63.27
11	29.31	10.15	60.54
12	7.16	14.27	78.57
13	7.16	14.27	78.57

The disclosures of JP 52084193 by Ichikawa and U.S. 4,100,180 by Ichikawa et al. are substantially identical, and in fact, are identical with respect to the concentration ranges disclosed and the Examples. In both references, the maximum zinc concentration of the broadest disclosed range is 19.96 atomic %, with a preferred maximum concentration of 17.76 atomic %. In one respect, since the maximum zinc concentration neither touches nor is particularly close to the minimum claimed concentration of 24 atomic % (not "about 24 atomic %") and since the preferred zinc concentration range is lower, the zinc concentration disclosures of both Ichikawa references teach away

from the zinc concentrations presently claimed. See MPEP §2144.05 Part III., which states:

> A *prima facie* case of obviousness may also be rebutted by showing that the art, ***in any material respect***, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)...

Herein, the prior art materially teaches away from the claimed zinc concentration of between 24 atomic % and 70, 50, 35, or 30 atomic % since the maximum zinc concentration in the broadest range is substantially below the claimed minimum, and the reference specifically prefers even lower zinc concentrations since the maximum preferred zinc concentration of 17.76 atomic % is lower than the broadest disclosed maximum zinc concentration of 19.96 atomic %. A disclosure of preferred concentrations that would tend to cause the ordinarily skilled person to optimize away from the claimed range is a material teaching away from the present claims. The highest zinc concentrations in any of the Examples of the Invention represent an even further teaching away since the highest concentration is still lower at only 14.27 atomic %. Accordingly, the Ichikawa examples would have caused the ordinarily skilled person to have optimized the zinc concentrations *away* from applicants' claimed minimum.

Ichikawa et al. also prepared various Comparative Examples. The Comparative Examples are not considered part of the Ichikawa et al. invention, but the disclosure of Comparative Examples is potentially relevant to the patentability of the pending claims. The following table displays the concentrations of each component in terms for atomic % for each of Ichikawa et al.'s Comparative Examples 1-9:

Compositions of Comparative Examples

Example	Iron (atomic %)	Zinc (atomic %)	Platinum (atomic %)
Comparative 1	14.62	13.69	71.70
Comparative 2	1.38	0	98.62
Comparative 3	2.27	8.31	89.42
Comparative 4	3.20	9.03	87.76
Comparative 5	3.23	20.35	76.42
Comparative 6	10.06	22.53	67.41
Comparative 7	1.86	15.08	83.06
Comparative 8	4.74	25.25	70.01
Comparative 9	13.85	0	86.15

None of the comparative examples describes an alloy meeting all of the limitations of the claims. The Office has asserted that "applicants admit that there are disclosed examples that teach the atomic % of Zn to be higher than 20%." This mischaracterizes the applicants' statements made in Amendment B. Even though one Comparative Example in the Ichikawa et al. references has a zinc concentration above the applicants' claim minimum of 24 atomic %, that Example defines a material that is materially and fundamentally outside the claimed requirements. Comparative Example 8 has an iron concentration of only 4.74 atomic %, which is significantly (75%!) less than the claimed minimum of 20 atomic %. Comparative Example 8 therefore defines a material that is substantially different from and outside the scope of the materials defined by claims. Therefore, none of the Comparative Examples describes any alloy meeting all of the limitations of the claims. The failure to disclose any such alloy means that the Comparative Examples also fail to anticipate claim 1 or render such claim obvious. And since only one example has greater than 24 atomic % zinc, a comparative example that Ichikawa's empirical results indicate is vastly inferior (as explained below) to the materials having much less than 24 atomic % zinc, the reference emphatically teaches away

from higher zinc concentrations and toward lower Zn concentrations.

> With respect to optimization, the Office asserts
>
> > Furthermore it is submitted that the ranges of the metallic elements of the alloy are result effective variables and it is within a skilled artisans level of knowledge and understanding how to perform the routine experimentation necessary to optimize the composition of the alloy.

In order to rely on optimization of a result effective variable, the Office must show that the result to be achieved by optimization is recognized in the art, e.g., the cited reference. The Office must not make any conclusion based on hindsight gleaned from applicants' disclosure. In any event, an assertion that one would optimize toward the claimed range, without supporting evidence in the prior art itself supporting that assertion, is the type of merely conclusory statement that the Supreme Court has held does not support *prima facie* obviousness. See MPEP 2143.01(IV), which cites *KSR* as holding that

> "...rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR* at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

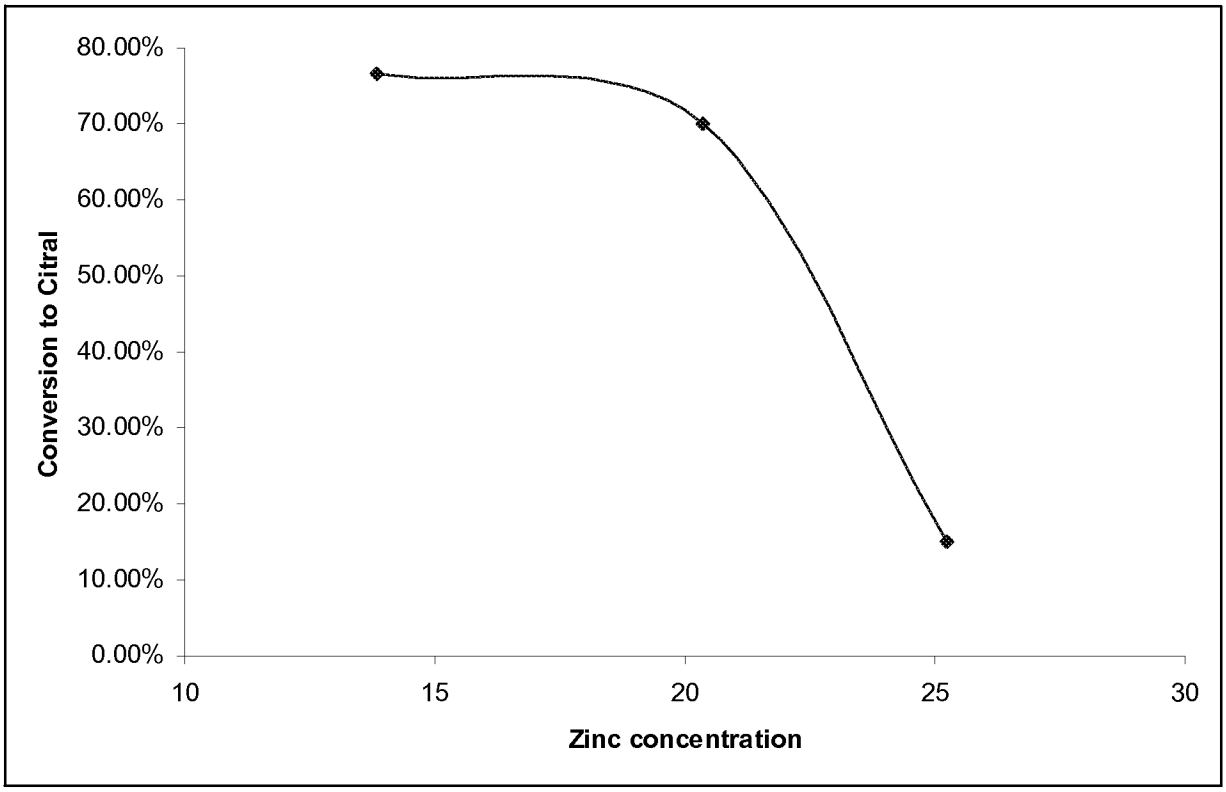
Accordingly, the Office must provide evidence in the reference itself (or extrinsic evidence) would have caused the ordinarily skilled person to first conclude that the variable achieves a recognized result and second optimize toward the claimed range. Herein, neither condition is met since the only evidence in the Ichikawa references that is potentially relevant to zinc concentrations within the claimed range conclusively

teaches that higher zinc concentrations are vastly inferior to lower zinc concentrations.

Thus, the disclosures in the Ichikawa references themselves would have dissuaded the ordinarily skilled person from optimizing via higher zinc concentrations. Ichikawa disclosed three alloys that are directly comparable in this regard: Comparative Example 5, Comparative Example 8, and Example 5. The following table shows the Pt, Fe, and Zn concentrations of these examples and the resultant conversion to citral as the zinc concentration is increased:

Example	Pt	Fe	Zn	Conversion to Citral
5	81.57	4.59	13.84	76.7%
Comparative 5	76.42	3.23	20.35	70%
Comparative 8	70.01	4.74	25.25	15%

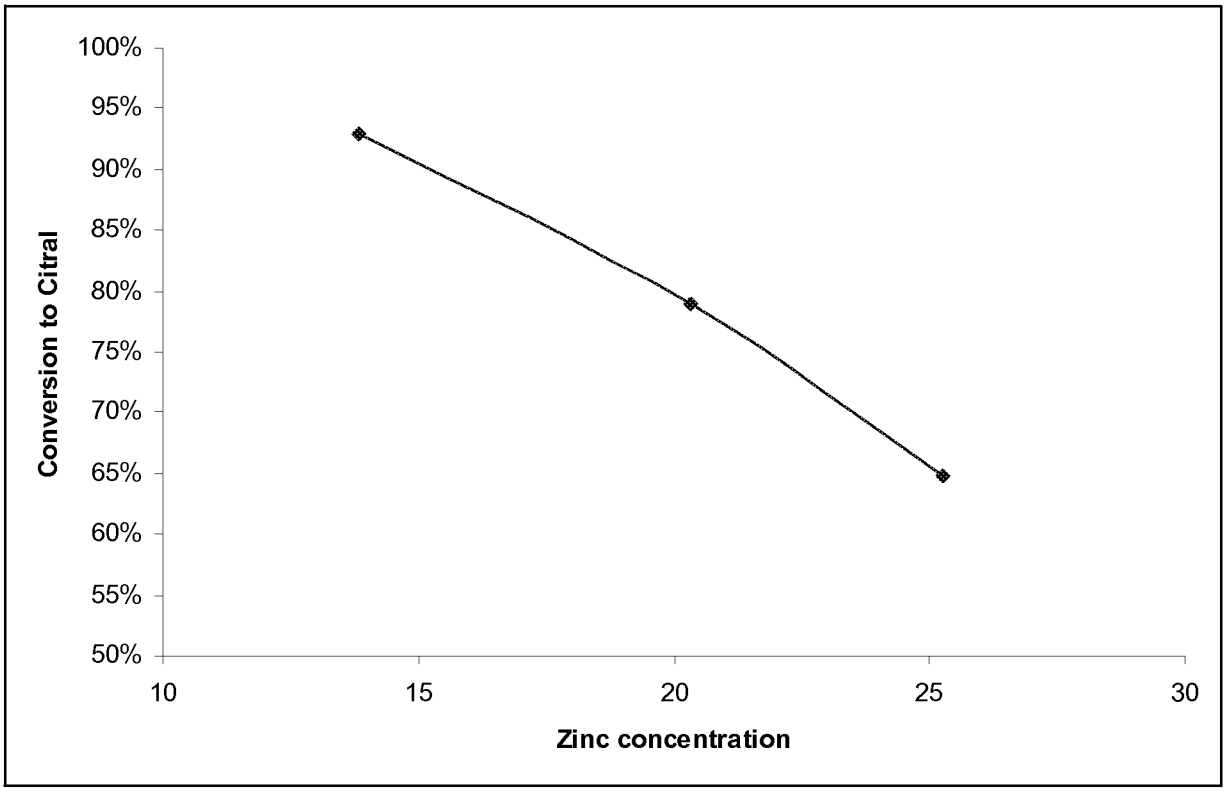
In each example, the iron concentration was very similar and the zinc concentration was progressively higher (at the expense of Pt). The conversion of citral dropped slightly as the zinc concentration was increased from about 14 to about 20 atomic %, but the conversion was severely lower as the zinc concentration was increased to 25 atomic %, which can be seen by the following graph:



The ordinarily skilled person having the benefit of these data would not have found any reason to optimize toward higher zinc concentrations in view of the precipitous drop in performance that occurs when the zinc concentration of this particular composition increases from just 20 atomic % to 25 atomic %.

The selectivity toward geraniol exhibited similar degradation in performance, though somewhat less drastic.

Example	Pt	Fe	Zn	Selectivity toward Geraniol
5	81.57	4.59	13.84	93%
Comparative 5	76.42	3.23	20.35	79%
Comparative 8	70.01	4.74	25.25	64.8%



These empirical results which are gleaned directly from the Ichikawa references conclusively show that higher zinc concentrations result in severe performance degradations for the particular experiments that Ichikawa performed. Accordingly, contrary to the Office's assertions, the ordinarily skilled person would not have found any reason to optimize in the direction of higher zinc concentrations. Rather, the ordinarily skilled person would have expected success only within the low zinc concentration ranges explicitly taught as preferred by Ichikawa.

If anything, Ichikawa's empirical evidence is even more damaging to the assertion of optimization since the alloys that have been compared above had iron concentrations that are significantly lower than the claimed minimum. In view of the art-recognized unpredictability in the field of catalysis, the ordinarily skilled person would not have had any basis for

optimizing these alloys in the direction of both higher iron and higher zinc concentrations at the expense of platinum, particularly since it is recognized that platinum is the catalytic material. See Col. 1, line 23 and 36 of U.S. 4,100,180, "...the platinum catalyst..."

The Office has asserted that the *Titanium Metals Corp. v. Banner* holding supports the Office's anticipation and/or obviousness analyses since the "alloys as claimed were obvious over a reference that disclosed percentages that were close but not identical." Applicants respectfully submit that neither the facts nor holding of *Titanium Metals Corp.* supports anticipation and/or obviousness herein. The following table shows the concentration ranges of the claims at issue directly against the concentrations of the components in the prior art alloy:

Components of Claimed Alloy	Components of Cited Art
0.6% to 0.9% Nickel	0.75% Nickel
0.2% to 0.4% molybdenum,	0.25% Molybdenum
up to 0.2% maximum iron, (optional)	
balance titanium,	Balance titanium

The disclosed alloy concentrations of the cited art at issue in *Titanium Metals* was not just close to the claims at issue, each alloy component concentration of the prior art was wholly within the claimed ranges. That is, the nickel and molybdenum concentrations were directly inside the ranges claimed. Accordingly, the cited art disclosed a species that fell right inside the genus claimed. This is not the case with respect to the present claims and the Ichikawa references. The present claims require a minimum of 24 atomic % zinc, while the Ichikawa references limit the maximum zinc concentration to 19.96 atomic %, with preferred zinc concentrations no greater than 17.76 atomic %. Further, as explained above, the Ichikawa references

provide convincing empirical evidence that would have dissuaded the ordinarily skilled person from even trying higher zinc concentrations in alloys further meeting the claimed iron and platinum concentrations.

In view of the foregoing, it is apparent that obviousness cannot be predicated on either of the Ichikawa references since the references do not disclose or suggest and in fact teach away from zinc concentrations in the claimed ranges; and further since Ichikawa's empirical evidence would have affirmatively dissuaded the ordinarily skilled person from even attempting to optimize in the direction of the claimed zinc concentrations. Applicants therefore respectfully request the obviousness rejections be withdrawn.

III. Claim Rejections Under 35 U.S.C. §§102(b)/103(a)

Reconsideration is requested of the rejection of claims 1, 2, 6, and 14 as being anticipated by or obvious in view of U.S. 4,100,180 by Ichikawa et al.

With regard to the anticipation rejection against the pending claims, MPEP §2131 states:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). >"When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) (claim to a system for setting a computer clock to an offset time to address the Year 2000 (Y2K) problem, applicable to records with year date data in "at least one of two-digit, three-digit, or four-digit" representations, was held anticipated by a

> system that offsets year dates in only two-digit formats). See also MPEP § **2131.02.**< "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

If anticipation is predicated on overlapping ranges, MPEP §2131.03 Part III. controls, which states:

> **III. PRIOR ART WHICH TEACHES A VALUE OR RANGE THAT IS VERY CLOSE TO, BUT DOES NOT OVERLAP OR TOUCH, THE CLAIMED RANGE DOES NOT ANTICIPATE THE CLAIMED RANGE**
> "[A]nticipation under § 102 can be found only when the reference discloses exactly what is claimed and that where there are differences between the reference disclosure and the claim, the rejection must be based on § 103 which takes differences into account." *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Claims to titanium (Ti) alloy with 0.8% nickel (Ni) and 0.3% molybdenum (Mo) were not anticipated by, although they were held obvious over, a graph in a Russian article on Ti-Mo-Ni alloys in which the graph contained an actual data point corresponding to a Ti alloy containing 0.25% Mo and 0.75% Ni.).

The Office has stated that the "19.96 atomic % Zn is about 24 atomic % Zn since it is sufficiently close to 'about 24', ..." There is no wiggle room in anticipation. MPEP §2131.03 Part III. clearly states that prior art ranges, even those that are very close to, "BUT DOES NOT OVERLAP OR TOUCH, THE CLAIMED RANGE DOES NOT ANTICIPATE THE CLAIMED RANGE." Accordingly, "sufficiently close" is insufficient to establish anticipation based on ranges. In this case, anticipation is not established herein since claim 1 requires a minimum zinc concentration of 24 atomic % (not "about 24 atomic %"), while the maximum zinc

concentration of the broadest range disclosed in the references is 19.96 atomic percent which neither touches nor is particularly close to the minimum zinc concentration required in the claim. There can be no anticipation of the pending claims over the U.S. 4,100,180 Ichikawa et al. reference.

IV. New Claims

New claims 36 and 37 require a minimum zinc concentration of 29 atomic %, which is substantially removed from the maximum zinc concentration disclosed in Ichikawa as 19.96 atomic %. Moreover, none of the examples have zinc concentrations that are even close to the minimum zinc concentration required by the claims. Finally, the ordinarily skilled person would not have found any reason to optimize toward such high zinc concentrations since the Ichikawa empirical results show that alloys having zinc concentration of 25 atomic % exhibit severely degraded performance compared to alloys having much lower zinc concentrations.

CONCLUSION

Applicants do not believe that a fee is required for the filing of this response, as it is being submitted within the three month shortened statutory period for reply. Should applicants be incorrect, the Commissioner is hereby authorized to charge the necessary fee to Deposit Account No. 19-1345.

Respectfully submitted,

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